

ESL

A Subsidiary of TRW

TRW

**COST, SCHEDULE, AND
WORK BREAKDOWN STRUCTURE
FBIS MODERNIZATION PROGRAM**

2 OCTOBER 1984

CONTRACT NO. 84X-927700-000

495 Java Drive • P.O. Box 3510 • Sunnyvale, CA 94088-3510 • 408.738.2888

Copy No. 4

COST, SCHEDULE, AND
WORK BREAKDOWN STRUCTURE
FBIS MODERNIZATION PROGRAM

CONTRACT NO. 84X*927700*000

2 OCTOBER 1984

ESL INCORPORATED
A SUBSIDIARY OF TRW
SUNNYVALE, CALIFORNIA

Page Denied

Next 2 Page(s) In Document Denied

A000 PROJECT MANAGEMENT.

A100 PROJECT OFFICE.

PROJECT MANAGER The project manager oversees the design and development of the FBIS Modernization Program (FMP). Activities include project planning scheduling, resource management supervision, and organization; directing and monitoring progress; interface with project performers and ESL management; conducting internal reviews; reviewing project deliverable documentation; and chairs the Contractor Change Control Board.

SECRETARY Supports the project manager and project performers in providing file maintenance, general correspondence, typing, travel arrangements and meeting arrangements as a level-of-effort function, consistent with the project manager's period of performance.

PROJECT REVIEWS Provides technical support to monthly presentation to SDS on technical progress by other than lead engineers.

A200 PROJECT SUPPORT

COST Cost activities involving Project Cost Reporting and PMS initiation, execution and reports analysis; sustaining cost and schedule control; ECP coordination and preparation; interface with contracts, Project Manager, project performers and SDS on project business related activities; provide action item status to SDS and prepare Sponsor-requested cost documentation.

SCHEDULING Develop and maintain Sponsor and project requested schedules based on inputs from project performers (DRD No. M31 and M32). This includes providing inputs to the project plan, initialization and maintenance of hardware/software/IC&T schedules and supporting internal and Sponsor reviews.

FMP DEVELOPMENT PLAN Prepare this document (DRD No. M09).

A300 CONFIGURATION MANAGEMENT

CONFIGURATION MANAGEMENT PLAN. Prepare and maintain a CM Plan DRD No. (TBD).

CONFIGURATION MANAGEMENT - HARDWARE Provide Configuration Management in accordance with the SDS and Contractor generated CM Plan. Implement a level-of-effort CM program to include Identification, Change Control, Status Accounting, and Audit supports. Provide design baseline configuration management.

CONFIGURATION MANAGEMENT - SOFTWARE Provide Configuration Management in accordance with the SDS and Contractor generated CM Plan. Implement Status Accounting, Librarian and Audit activities. Provide design baseline configuration management.

DATA MANAGEMENT Provide the traceability, retrievability, accountability, and control of all contract deliverable documentation. This activity includes CCB/serialization, document services, and librarian functions.

FUNCTIONAL CONFIGURATION AUDIT (FCA) PHYSICAL CONFIGURATION AUDIT (PCA) The FCA for hardware shall verify that each hardware item meets its performance requirements as determined by the CM identification documents and factory test results. The PCA shall verify that the developed products are in conformance with the applicable technical documents as reflected in CM status and contents of impounded baselines. The FCA for the software shall verify that the performance requirements are met by recording the results of the software Factory Acceptance Test. A software PCA shall be performed for each CPCI to assure it is physically documented by prepared Part I's, Part II's and other required/related software data.

A400 QUALITY ASSURANCE

QUALITY ASSURANCE PLAN. Provide for the preparation of QA plan (DRD No. (TBD)) which will guide the performance of hardware and software quality assurance activities through the period of performance.

REVIEWS AND AUDITS Provide Quality Assurance support to hardware and subsystem reviews by reviewing deliverable documentation for compliance with project and company's standards. Perform in-progress quality assurance audits to ensure that products are being developed in compliance with project and company standards and satisfactorily meet project requirements.

TEST SUPPORT Provide Quality Assurance support during preparation for and performance of Factory Acceptance Test. Review test plans, procedures, results, and reports for compliance to project and company's standards.

A500 PUBLICATION SERVICES

PUBLICATIONS Provide editing, word processing, and printing support for major project data item deliverables. Provides for coordination between project performers and publication services.

B000 SYSTEM ENGINEERING.

BA10 MANAGEMENT HQ.

MANAGEMENT Provide technical direction for all headquarters subsystem engineering activities by interfacing with element engineers and technical support engineers to resolve subsystem level problems. Includes attendance at project staff meetings directing day-to-day technical activities and maintenance of cost/schedule progress.

INTERNAL DESIGN REVIEWS Conduct periodical design reviews for the subsystem to determine the current technical status of subsystem level product development.

CCCB SUPPORT Evaluate and provide inputs to configuration management on proposed changes as a member of CCCB.

BA20 ANALYSES HQ.

REQUIREMENTS ANALYSIS Provide requirements audit and support requirement traceability.

PERFORMANCE ANALYSIS Perform subsystem performance analysis in the support of subsystem architecture selection and preliminary and detailed design activities. Results of these analyses shall be documented in Engineering Technical Notes.

REQUIREMENTS TRACEABILITY Provide for the necessary modification of the requirement traceability data base to support verification traceability. Prepare the requirements traceability portion of this matrix in accordance with DRD M13.

TRADE STUDIES Accomplish subsystem architecture and design studies. The results of these trade studies shall be documented in Engineering Technical Notes.

BA30 DESIGN HQ.

ARCHITECTURE DESIGN AND EVALUATION Perform the allocation of headquarters subsystem requirements to alternative hardware, software, and operations architecture. Architectures considered will be variations from the architecture established during CDP. Provide for evaluation of the alternative architectures and architecture selection. Document the architecture selection in Engineering Technical Note.

SUBSYSTEM DESIGN SPEC Prepare the subsystem design specification (DRD No. M07) to reflect the results of requirements allocation and architecture design analysis and evaluation.

INTERNAL INTERFACE SPECS Analyze the interface requirements and develop and document the interface specifications in the following documents:

HW-SW	I/F SPEC	(DRD No. (TBD))
SW-SW	I/F SPEC	(DRD No. (TBD))

BA40 TECHNICAL REVIEWS HQ.

REQUIREMENTS AUDIT Provide all required ESL resources for the preparation of and the participation in the Requirements Audit.

DCR Provide all required ESL resources for the preparation of and the participation in the Design Concept Review (DCR).

PDR Provide all required ESL resources for the preparation of and the participation in the Preliminary Design Review (PDR).

CDR Provide all required ESL resources for the preparation of and the participation in the Critical Design Review (CDR).

BA50 TEST AND VERIFICATION PLANS HQ.

SUBSYSTEM TEST PLAN Prepare subsystem test and verification plan
DRD No. M14 and M26.

HEADQUARTERS TRANSITION/INTEGRATION PLAN Prepare the subsystem
transition/integration plan DRD No. (TBD).

HEADQUARTERS TEST PROCEDURES Develop, document, and maintain
subsystem Test Procedures prepared DRD No. M17.

HEADQUARTERS VERIFICATION TRACEABILITY MATRIX Prepare and maintain
the verification portion of the traceability matrix incorporated
within the requirement traceability matrix (DRD No. M13).

BA60 HEADQUARTERS OPERATIONS ENGINEERING AND DEVELOPMENT.

HEADQUARTERS OPS CONCEPT Prepare the subsystem Operations Concept
(DRD No. M06).

HEADQUARTERS OPERATIONAL POSITION PROCEDURE Based on the Subsystem
Operations Concept, develop and document the operations requirements
for the operator positions in the Operational Position Procedure
prepared DRD No. M22.

BB10 MANAGEMENT FB.

MANAGEMENT Provide technical direction for all field bureau subsystem engineering activities by interfacing with element engineers and technical support engineers to resolve subsystem level problems. Includes attendance at project staff meetings directing day-to-day technical activities and maintenance of cost/schedule progress.

INTERNAL DESIGN REVIEWS Conduct periodical design reviews for the subsystem to determine the current technical status of subsystem level product development.

CCCB SUPPORT Evaluate and provide inputs to configuration management on proposed changes as a member of CCCB.

BB20 ANALYSES FB.

REQUIREMENTS ANALYSIS Provide requirements audit and support requirement traceability.

PERFORMANCE ANALYSIS Perform subsystem performance analysis in the support of subsystem architecture selection and preliminary and detailed design activities. Results of these analyses shall be documented in Engineering Technical Notes.

REQUIREMENTS TRACEABILITY Provide for the necessary modification of the requirement traceability data base to support verification traceability. Prepare the requirements traceability portion of this matrix in accordance with DRD M13.

TRADE STUDIES Accomplish subsystem architecture and design studies. The results of these trade studies shall be documented in Engineering Technical Notes.

BB30 DESIGN

ARCHITECTURE DESIGN AND EVALUATION Perform the allocation of bureau subsystem requirements to alternative hardware, software, and operations architecture. Architectures considered will be variations from the architecture established during CDP. Provide for evaluation of the alternative architectures and architecture selection. Document the architecture selection in Engineering Technical Note.

SUBSYSTEM DESIGN SPEC Prepare the subsystem design specification (DRD No. M07) to reflect the results of requirements allocation and architecture design analysis and evaluation.

INTERNAL INTERFACE SPECS Analyze the interface requirements and develop and document the interface specifications in the following documents:

HW-SW	I/F SPEC	(DRD No. (TBD))
SW-SW	I/F SPEC	(DRD No. (TBD))

BB40 TECHNICAL REVIEWS FB.

REQUIREMENTS AUDIT Provide all required ESL resources for the preparation of and the participation in the Requirements Audit.

DCR Provide all required ESL resources for the preparation of and the participation in the Design Concept Review (DCR).

PDR Provide all required ESL resources for the preparation of and the participation in the Preliminary Design Review (PDR).

CDR Provide all required ESL resources for the preparation of and the participation in the Critical Design Review (CDR).

BB50 TEST AND VERIFICATION PLANS FB.

SUBSYSTEM TEST PLAN Prepare subsystem test and verification plan
DRD No. M14 and M26.

BUREAU TRANSITION/INTEGRATION PLAN Prepare the subsystem
transition/integration plan DRD No. (TBD).

BUREAU TEST PROCEDURES Develop, document, and maintain subsystem
Test Procedures prepared DRD No. M17.

BUREAU VERIFICATION TRACEABILITY MATRIX Prepare and maintain the
verification portion of the traceability matrix incorporated within
the requirement traceability matrix (DRD No. M13).

BB60 BUREAU OPERATIONS ENGINEERING AND DEVELOPMENT.

BUREAU OPS CONCEPT Prepare the subsystem Operations Concept DRD
No. M06.

BUREAU OPERATIONAL POSITION PROCEDURE Based on the Subsystem
Operations Concept, develop and document the operations requirements
for the operator positions in the Bureau Operational Position
Procedure prepared DRD No. M22.

C000 HARDWARE ENGINEERING.

CA00 HARDWARE ENGINEERING HEADQUARTERS.

CA10 HARDWARE MANAGEMENT HQ.

MANAGEMENT Include a level-of-effort lead engineer to oversee the hardware development activities. This task includes attendance at weekly project staff meetings, directing day-to-day technical activities and maintenance of cost/schedule progress.

INTERNAL DESIGN REVIEWS Conduct periodic hardware design reviews to determine the technical status of hardware product development.

CCCB SUPPORT Evaluate and provide inputs to configuration management in proposed changes as a member of CCCB.

CA20 HARDWARE DESIGN HQ.

MAIN Specify for the hardware configuration item all performance interface, test, and design requirements. Include the effort to prepare CI Specification DRD No. (TBD).

SYSTEM EFFECTIVENESS Implements availability/reliability design requirements; perform availability modeling and MTBF prediction on the selected baseline architecture. Performs subsystem maintainability requirement allocation and prediction analysis. The product of these analyses shall be documented in Engineering Technical Notes.

DOCUMENTATION Provides for preparation for HQ Subsystem level Equipment and Operation Manual DRD No. M21.

CA30 PROCUREMENT/FABRICATION/ASSEMBLY HQ.

PROCUREMENT SUPPORT Includes the activity to prepare the procurement documentation and to track the status of equipment delivery and to coordinate these deliveries with hardware integration and test.

PROCUREMENT Includes the procurement of all hardware and vendor data associated with the headquarter's subsystem.

FABRICATION Manufacture/procurement of components for and the build of special equipment items. It is anticipated that no effort will be involved for headquarters.

ASSEMBLY This involves the rack assembly, vendor equipment installation into the racks, I/F cards between equipment and cabling hook-up for all CIs of the subsystem. Includes unit level vendor acceptance tests as required. It is anticipated that no effort will be involved for headquarters.

CA40 FACILITY PLANNING HQ.

FACILITY INTERFACE DRAWINGS Analyze GFE site standards and facility interface requirements. Develop facility layouts and interface specifications and document these in facility interface drawings prepared DRD No. M28.

CA50 H/W INTEGRATION SUPPORT HQ.

INTEGRATION PLAN Provide for preparation of the internal Hardware Integration Plan. DRD No. (TBD).

TEST SUPPORT Provides hardware support to subsystem integration and test and Factory Acceptance Tests.

CB00 HARDWARE ENGINEERING - FIELD BUREAU

CB10 MANAGEMENT FB.

MANAGEMENT Include a level-of-effort lead engineer to oversee the hardware development activities. This task includes attendance at weekly project staff meetings, directing day-to-day technical activities and maintenance of cost/schedule progress.

INTERNAL DESIGN REVIEWS Conduct periodic hardware design reviews to determine the technical status of hardware product development.

CCCB SUPPORT Evaluate and provide inputs to configuration management in proposed changes as a member of CCCB.

CB20 HARDWARE DESIGN FB.

BUREAU Specify for the hardware configuration item (CI) all performance interface, test, and design requirements. Include the effort to prepare CI Specification DRD No. (TBD).

SYSTEM EFFECTIVENESS Implements availability/reliability design requirements; perform availability modeling and MTBF prediction on the selected baseline architecture. Performs subsystem maintainability requirement allocation and prediction analysis. The product of these analyses shall be documented in Engineering Technical Notes.

DOCUMENTATION Provides for preparation for FB Subsystem level Equipment and Operation Manual DRD No. M21.

MECHANICAL/ELECTRICAL DESIGN Includes the support to the definition of hardware equipment, and specification of the interfaces. Includes the support to the design of the rack layout.

CB30 PROCUREMENT/FABRICATION/ASSEMBLY FB.

PROCUREMENT SUPPORT Includes the activity to prepare the procurement documentation and to track the status of equipment delivery and to coordinate these deliveries with hardware integration and test.

PROCUREMENT Includes the procurement of all hardware and vendor data associated with the FB CI.

FABRICATION Manufacture/procurement of components for and the build of special equipment items.

ASSEMBLY This involves the rack assembly, vendor equipment installation into the racks, I/F cards between equipment and cabling hook-up for all CIs of the subsystem. Includes unit level vendor acceptance tests as required.

CB40 FACILITY PLANNING FB.

FACILITY INTERFACE DRAWINGS Analyze GFE site standards and facility interface requirements. Develop facility layouts and interface specifications and document these in facility interface drawings prepared DRD No. M21.

CA50 H/W INTEGRATION SUPPORT FB.

INTEGRATION PLAN Provide for preparation of the internal Hardware Integration Plan. DRD No. (TBD).

TEST SUPPORT Provides hardware support to subsystem integration and test and Factory Acceptance Tests.

DA00 SOFTWARE ENGINEERING HQ.

DA10 SOFTWARE MANAGEMENT HQ.

MANAGEMENT Includes a level-of-effort lead engineer to oversee the software development activities. This task includes preparation of subsystem PPS&C (DRD No. M12), attendance at weekly project staff meetings, directing day-to-day technical activities, and maintenance of cost/schedule progress.

INTERNAL DESIGN REVIEWS Conduct periodic design reviews for all CPCIs to assess the technical status of the evolving software products.

CCB SUPPORT Evaluate and provide inputs to configuration management on proposed changes as a member of CCB.

DA20 SOFTWARE DESIGN HQ.

Accomplish definition and design of new modules and modifications to existing module designs. Includes preparation of

- PART I SPEC Prepare and maintain DRD No. M10.
- PART II SPEC Prepare and maintain DRD No. M15.
- Software Operations Manual Prepare and maintain DRD No. M16

DATA BASE SPEC Analyze the subsystem data base requirements and design the required data base structure and content. Document this design in the subsystem Data Base Specification prepared DRD No. M11.

DA30 IMPLEMENTATION AND TEST HQ.

CPCI Development of new modules, the modifications to existing modules as required after CDR, and the unit test of all modules. Supports the integration of the CPCs into the CPCI. Update the CDRs Part II Specification to "as-built".

DA40 INTEGRATION/TEST SUPPORT HQ.

PLAN Develop internal software integration plan for each CPCI.

CPCI LEVEL TEST Conduct the CPCI level software integration and test.

SUPPORT TEST/VERIFICATION Provide support for CPCIs during subsystem level test and verification.

DB00 SOFTWARE ENGINEERING FB.

DB10 SOFTWARE MANAGEMENT FB.

MANAGEMENT Includes a level-of-effort lead engineer to oversee the software development activities. This task includes preparation of FB subsystem PPS&C (DRD No. M12), attendance at weekly project staff meetings, directing day-to-day technical activities, and maintenance of cost/schedule progress.

INTERNAL DESIGN REVIEWS Conduct periodic design reviews for all CPCIs to assess the technical status of the evolving software products.

CCB SUPPORT Evaluate and provide inputs to configuration management on proposed changes as a member of CCB.

DB20 SOFTWARE DESIGN FB.

Accomplish definition and design of new modules and modifications to existing module designs. Includes preparation of

- PART I SPEC Prepare and maintain DRD No. (TBD).
- PART II SPEC Prepare and maintain DRD No. (TBD).
- Software Operations Manual Prepare and maintain DRD No. M16

DATA BASE SPEC Analyze the subsystem data base requirements and design the required data base structure and content. Document this design in the subsystem Data Base Specification prepared DRD No. M11.

DB30 IMPLEMENTATION AND TEST FB.

CPCI Development of new modules, the modifications to existing modules as required after CDR, and the unit test of all modules. Supports the integration of the CPCs into the CPCI. Update the CDRs Part II Specification to "as-built".

DB40 INTEGRATION/TEST SUPPORT FB.

PLAN Develop internal software integration plan for each CPCI.

CPCI LEVEL TEST Conduct the CPCI level software integration and test.

SUPPORT TEST/VERIFICATION Provide support for CPCIs during subsystem level test and verification.

E000 INTEGRATION AND TEST.

E100 MANAGEMENT.

IC&T MANAGER Involves managing all activities during Subsystem Integration and Test, Factory Acceptance Test, site installation, checkout and test as a level-of-effort function.

CCCB SUPPORT Evaluate and provide inputs to proposed changes as a member of CCCB.

E200 FMP TEST AND INTEGRATION.

PLAN Develop internal subsystem integration plans.

CPCI I&T Integrate and test interfaces between CPCIs for the FMP.

E300 FACTORY ACCEPTANCE TEST.

DRY RUN Includes the preparation for the Factory Acceptance Test. Will perform the test procedures to establish the readiness for Factory Acceptance Test and to validate the test procedures.

FACTORY ACCEPTANCE TEST Includes the effort of the designated test team to perform Acceptance Test in accordance with the approved test procedures.

CLEAN UP The test conductor shall identify any deviation from the procedures and obtain concurrence. Includes the effort necessary to correct listed deficiencies before retesting can proceed.

TEST REPORT Prepare DRD No. M25.

F000 TRAINING.

F100 TRAINING PLAN Prepare and maintain DRD No. M19.

F200 OPERATOR TRAINING MATERIAL In accordance with the Training Plan, prepared in Work Order, prepare for the presentation of the training course including preparation of required training material.

F300 TRAINING COURSE Presentation of training material at all installation sites.

G000 INSTALLATION, CHECKOUT, TEST.

GA00 HEADQUARTERS.

ICT PLAN Prepare the ICT plan DRD M20.

HEADQUARTERS PACK AND SHIP Provide for packing all deliverable equipment.

HEADQUARTERS INSTALLATION AND CHECKOUT Unpack equipment, prepare floor area, position equipment, reassemble racks and chassis, test power, connect cables and troubleshoot.

HEADQUARTERS ACCEPTANCE TEST	Involves running acceptance tests subsystem test procedures.
------------------------------	--

TEST REPORT Prepare DRD No. M25.

DELIVERY DOCUMENTATION Prepare the following "as-built" documentation required with the subsystem shipment to site.

CPCI Listing DRD M23

Software Version Description DRD (TBD)

GB00 BUREAUS.

BUREAU PACK AND SHIP Provide for packing all deliverable equipment.

BUREAU INSTALLATION AND CHECKOUT Unpack equipment, prepare floor area, position equipment, reassemble racks and chassis, test power, connect cables and troubleshoot.

BUREAU ACCEPTANCE TEST Involves running acceptance tests subsystem test procedures.

TEST REPORT Prepare DRD No. M25.

DELIVERY DOCUMENTATION Prepare the following "as-built"
documentation required with the subsystem shipment to site.

CPCI Listing	DRD M23
Software Version Description	DRD (TBD)

H000 FACTORY TEST BED.

H100 FACILITY PREPARATION.

Provides for the preparation of the staging and test area for bureau systems and the development system for the headquarters data base subsystem.

H200 FACILITY SUPPORT.

Provides management of the ESL development facility, receipt, and inventory of site specific items, and the coordination of vendor-supplied maintenance.

VENDOR MAINTENANCE Provides vendor maintenance of equipment in the Development Facility from installation to shipment.

I000 TRAVEL

TRAVEL Supports the direct expenses incurred by project related travel.

I100 TRAVEL TO SUPPORT PROJECT MANAGEMENT.

I200 TRAVEL TO SUPPORT SYSTEM ENGINEERING.

I300 TRAVEL TO SUPPORT HARDWARE ENGINEERING.

I400 TRAVEL TO SUPPORT INSTALLATION.

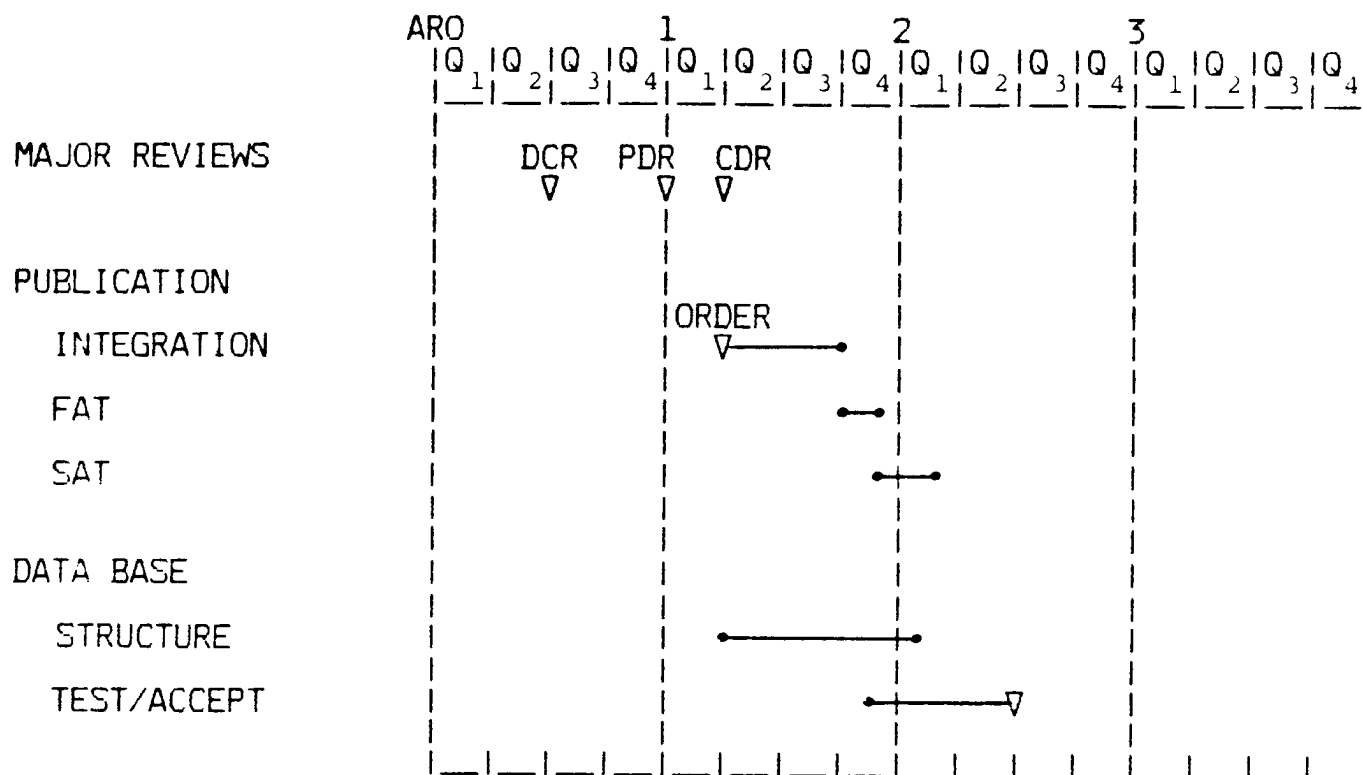
I500 TRAVEL TO SUPPORT TRAINING.

J000 OPERATIONS, MAINTENANCE, AND LOGISTICS.

 Estimate to support O&M for hand off to the Sponsor.

Prepare Operation and Logistics Plan (OLMP) DRD M18.

SCHEDULE - HEADQUARTERS



SCHEDULE - BUREAU

